

CLAIMS

What is claimed is:

1. An isolated SLC26A7 polypeptide.
2. The isolated SLC26A7 polypeptide of claim 1, further comprising:
 - 5 (a) a polypeptide of SEQ ID NO:2 or 4;
 - (b) a polypeptide substantially identical to SEQ ID NO:2 or 4;
 - (c) a polypeptide encoded by a nucleic acid molecule of SEQ ID NO:1 or 3; or
 - 10 (d) a polypeptide encoded by a nucleic acid molecule substantially identical to SEQ ID NO:1 or 3.
3. The isolated SLC26A7 polypeptide of claim 1, wherein the SLC26A7 polypeptide is encoded by an isolated nucleic acid molecule selected from the group consisting of:
 - 15 (a) an isolated nucleic acid molecule encoding a polypeptide of SEQ ID NO:2 or 4;
 - (b) an isolated nucleic acid molecule of SEQ ID NO:1 or 3;
 - (c) an isolated nucleic acid molecule which hybridizes to a nucleic acid sequence of SEQ ID NO:1 or 3 under wash stringency conditions represented by a wash solution having less than
20 about 200 mM salt concentration and a wash temperature of greater than about 45°C, and which encodes a SLC26A7 polypeptide; and
 - (d) an isolated nucleic acid molecule differing by at least one functionally equivalent codon from the isolated nucleic acid
25 molecule of one of (a), (b), and (c) above in nucleic acid sequence due to the degeneracy of the genetic code, and which encodes a SLC26A7 polypeptide encoded by the isolated nucleic acid of one of (a), (b), and (c) above.
4. The isolated SLC26A7 polypeptide of claim 1, further comprising a
30 functional SLC26A7 polypeptide.
5. The functional SLC26A7 polypeptide of claim 4, wherein the functional property comprises chloride transport.

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6. A system for recombinant expression of a SLC26A7 polypeptide, the system comprising:
- (a) a SLC26A7 polypeptide; and
 - (b) a host cell comprising the SLC26A7 polypeptide.
- 5 7. An isolated *SLC26A7* nucleic acid molecule.
8. The isolated *SLC26A7* nucleic acid molecule of claim 7, further comprising a nucleic acid molecule encoding a SLC26A7 polypeptide.
9. The isolated *SLC26A7* nucleic acid of claim 7, further comprising:
- (a) a nucleotide sequence of SEQ ID NO:1 or 3; or
 - 10 (b) a nucleotide sequence substantially identical to SEQ ID NO:1 or 3.
10. The isolated *SLC26A7* nucleic acid molecule of claim 7, further comprising a nucleic acid molecule selected from the group consisting of:
- (a) an isolated nucleic acid molecule encoding a polypeptide of
 - 15 SEQ ID NO:2 or 4;
 - (b) an isolated nucleic acid molecule of SEQ ID NO:1 or 3;
 - (c) an isolated nucleic acid molecule which hybridizes to a nucleic acid sequence of SEQ ID NO:1 or 3 under wash stringency conditions represented by a wash solution having less than
 - 20 about 200 mM salt concentration and a wash temperature of greater than about 45°C, and which encodes a SLC26A7 polypeptide; and
 - (d) an isolated nucleic acid molecule differing by at least one functionally equivalent codon from the isolated nucleic acid
 - 25 molecule of one of (a), (b), and (c) above in nucleic acid sequence due to the degeneracy of the genetic code, and which encodes a SLC26A7 polypeptide encoded by the isolated nucleic acid of one of (a), (b), and (c) above.
11. A method for detecting a *SLC26A7* nucleic acid molecule, the method
- 30 comprising:
- (a) procuring a biological sample having nucleic acid material;
 - (b) hybridizing the nucleic acid molecule of SEQ ID NO:1 or 3

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under stringent hybridization conditions to the biological sample of (a), thereby forming a duplex structure between the nucleic acid of SEQ ID NO:1 or 3 and a nucleic acid within the biological sample; and

- 5 (c) detecting the duplex structure of (b), whereby a SLC26A7 nucleic acid molecule is detected.

12. A method for producing an antibody that specifically recognizes a SLC26A7 polypeptide, the method comprising:

- 10 (a) recombinantly or synthetically producing a SLC26A7 polypeptide;
- (b) formulating the polypeptide of (a) whereby it is an effective immunogen;
- (c) administering to an animal the formulation of (b) to generate an immune response in the animal comprising production of
- 15 antibodies, wherein antibodies are present in the blood serum of the animal; and
- (d) collecting the blood serum from the animal of (c) comprising antibodies that specifically recognize a SLC26A7 polypeptide.

13. The method of claim 12, wherein the SLC26A7 polypeptide

20 comprises:

- (a) a polypeptide encoded by a nucleic acid of SEQ ID NO:1 or 3;
- (b) a polypeptide encoded by a nucleic acid substantially identical to SEQ ID NO:1 or 3;
- (c) a polypeptide comprising an amino acid sequence of SEQ ID
- 25 NO:2 or 4; or
- (d) a polypeptide substantially identical to SEQ ID NO:2 or 4.

14. The method of claim 12, wherein the SLC26A7 polypeptide is encoded by an isolated nucleic acid segment selected from the group consisting of:

- 30 (a) an isolated nucleic acid molecule encoding a polypeptide of SEQ ID NO:2 or 4;
- (b) an isolated nucleic acid molecule of SEQ ID NO:1 or 3;

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- 5 (c) an isolated nucleic acid molecule which hybridizes to a nucleic acid sequence of SEQ ID NO:1 or 3 under wash stringency conditions represented by a wash solution having less than about 200 mM salt concentration and a wash temperature of greater than about 45°C, and which encodes a functional SLC26A7 polypeptide; and
- 10 (d) an isolated nucleic acid molecule differing by at least one functionally equivalent codon from the isolated nucleic acid molecule of one of (a), (b), and (c) above in nucleic acid sequence due to the degeneracy of the genetic code, and which encodes a SLC26A7 polypeptide encoded by the isolated nucleic acid of one of (a), (b), and (c) above.
- 15 15. An antibody produced by the method of claim 12.
16. A method for detecting a level of a SLC26A7 polypeptide, the method
- 15 comprising
- (a) obtaining a biological sample having peptidic material;
- (b) detecting a SLC26A7 polypeptide in the biological sample of (a) by immunochemical reaction with the antibody of claim 13, whereby an amount of SLC26A7 polypeptide in a sample is
- 20 determined.
17. A method for identifying a modulator of a SLC26A7 polypeptide, the method comprising:
- (a) providing a recombinant expression system whereby a SLC26A7 polypeptide is expressed in a host cell;
- 25 (b) providing a test substance to the system of (a);
- (c) assaying a level or quality of SLC26A7 function in the presence of the test substance;
- (d) comparing the level or quality of SLC26A7 function in the presence of the test substance with a control level or quality of SLC26A7 function; and
- 30 (e) identifying a test substance as an anion transport modulator by determining a level or quality of SLC26A7 function in the

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presence of the test substance as significantly changed when compared to a control level or quality of SLC26A7 function.

18. The method of claim 17, wherein the SLC26A7 polypeptide comprises:

- 5 (a) a polypeptide encoded by a nucleic acid of SEQ ID NO:1 or 3;
- (b) a polypeptide encoded by a nucleic acid substantially identical to SEQ ID NO:1 or 3;
- (c) a polypeptide comprising an amino acid sequence of SEQ ID NO:2 or 4; or
- 10 (d) a polypeptide substantially identical to SEQ ID NO:2 or 4.

19. The method of claim 17, wherein the SLC26A7 polypeptide is encoded by an isolated nucleic acid segment selected from the group consisting of:

- 15 (a) an isolated nucleic acid molecule encoding a polypeptide of SEQ ID NO:2 or 4;
- (b) an isolated nucleic acid molecule of SEQ ID NO:1 or 3;
- (c) an isolated nucleic acid molecule which hybridizes to a nucleic acid sequence of SEQ ID NO:1 or 3 under wash stringency conditions represented by a wash solution having less than
- 20 about 200 mM salt concentration and a wash temperature of greater than about 45°C, and which encodes a functional SLC26A7 polypeptide; and
- (d) an isolated nucleic acid molecule differing by at least one functionally equivalent codon from the isolated nucleic acid molecule of one of (a), (b), and (c) above in nucleic acid
- 25 sequence due to the degeneracy of the genetic code, and which encodes a SLC26A7 polypeptide encoded by the isolated nucleic acid of one of (a), (b), and (c) above.

20. The method of claim 17, wherein the host cell comprises a
30 mammalian cell.

21. The method of claim 20, wherein the mammalian cell comprises a human cell.

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22. An anion transporter modulator identified by the method of claim 17.

23. A method for modulating anion transport activity in a subject, the method comprising:

- 5 (a) preparing a composition comprising a modulator identified according to the method of claim 17, and a pharmaceutically acceptable carrier;
- (b) administering an effective dose of the composition to a subject, whereby anion transport activity is altered in the subject.

24. The method of claim 23, wherein the subject is a mammal.

10 25. The method of claim 24, wherein the subject is a human.

26. A method for identifying an anion exchanger modulator, the method comprising:

- (a) exposing a SLC26A7 polypeptide to one or more test substances;
- 15 (b) assaying binding of a test substance to the isolated SLC26A7 polypeptide; and
- (c) selecting a candidate substance that demonstrates specific binding to the SLC26A7 polypeptide.

20 27. The method of claim 26, wherein the SLC26A7 polypeptide comprises:

- (a) a polypeptide encoded by a nucleic acid of SEQ ID NO:1 or 3;
- (b) a polypeptide encoded by a nucleic acid substantially identical to SEQ ID NO:1 or 3;
- (c) a polypeptide comprising an amino acid sequence of SEQ ID NO:2 or 4; or
- 25 (d) a polypeptide substantially identical to SEQ ID NO:2 or 4.

28. The method of claim 26, wherein the SLC26A7 polypeptide is encoded by an isolated nucleic acid segment selected from the group consisting of:

- 30 (a) an isolated nucleic acid molecule encoding a polypeptide of SEQ ID NO:2 or 4;
- (b) an isolated nucleic acid molecule of SEQ ID NO:1 or 3;

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- 5 (c) an isolated nucleic acid molecule which hybridizes to a nucleic acid sequence of SEQ ID NO:1 or 3 under wash stringency conditions represented by a wash solution having less than about 200 mM salt concentration and a wash temperature of greater than about 45°C, and which encodes a functional SLC26A7 polypeptide; and
- 10 (d) an isolated nucleic acid molecule differing by at least one functionally equivalent codon from the isolated nucleic acid molecule of one of (a), (b), and (c) above in nucleic acid sequence due to the degeneracy of the genetic code, and which encodes a SLC26A7 polypeptide encoded by the isolated nucleic acid of (a), (b), and (c) above.
29. The method of claim 26, wherein the host cell comprises a mammalian cell.
- 15 30. The method of claim 29, wherein the mammalian cell comprises a human cell.
31. An anion transporter modulator identified by the method of claim 26.
32. A method for modulating anion transport activity in a subject, the method comprising:
- 20 (a) preparing a composition comprising a modulator identified according to the method of claim 26, and a pharmaceutically acceptable carrier;
- (b) administering an effective dose of the composition to a subject, whereby anion transport activity is altered in the subject.
- 25 33. The method of claim 32, wherein the subject is a mammal.
34. The method of claim 33, wherein the subject is a human.
35. An isolated SLC26A9 polypeptide.
36. The isolated SLC26A9 polypeptide of claim 35, further comprising:
- 30 (a) a polypeptide of SEQ ID NO:6, 8, or 10;
- (b) a polypeptide substantially identical to SEQ ID NO:6, 8, or 10;
- (c) a polypeptide encoded by a nucleic acid molecule of SEQ ID NO:5, 7, or 9; or

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- (d) a polypeptide encoded by a nucleic acid molecule substantially identical to SEQ ID NO:5, 7, or 9.

37. The isolated SLC26A9 polypeptide of claim 35, wherein the SLC26A9 polypeptide is encoded by an isolated nucleic acid molecule selected from

5 the group consisting of:

- (a) an isolated nucleic acid molecule encoding a polypeptide of SEQ ID NO:6, 8, or 10;
- (b) an isolated nucleic acid molecule of SEQ ID NO:5, 7, or 9;
- 10 (c) an isolated nucleic acid molecule which hybridizes to a nucleic acid sequence of SEQ ID NO:5, 7, or 9 under wash stringency conditions represented by a wash solution having less than about 200 mM salt concentration and a wash temperature of greater than about 45°C, and which encodes a SLC26A9 polypeptide; and
- 15 (d) an isolated nucleic acid molecule differing by at least one functionally equivalent codon from the isolated nucleic acid molecule of one of (a), (b), or (c) above in nucleic acid sequence due to the degeneracy of the genetic code, and which encodes a SLC26A9 polypeptide encoded by the
- 20 isolated nucleic acid of one of (a), (b), or (c) above.

38. The isolated SLC26A9 polypeptide of claim 37, further comprising a functional SLC26A9 polypeptide.

39. The functional SLC26A9 polypeptide of claim 38, wherein the functional property comprises chloride transport.

25 40. The functional SLC26A9 polypeptide of claim 38, wherein the functional property comprises bicarbonate ion transport.

41. A system for recombinant expression of a SLC26A9 polypeptide, the system comprising:

- (a) a SLC26A9 polypeptide; and
- 30 (b) a host cell comprising the SLC26A9 polypeptide.

42. An isolated *SLC26A9* nucleic acid molecule.

43. The isolated *SLC26A9* nucleic acid molecule of claim 42, further comprising a nucleic acid molecule encoding a *SLC26A9* polypeptide.
44. The isolated *SLC26A9* nucleic acid of claim 42, further comprising:
- (a) a nucleotide sequence of SEQ ID NO:5, 7, or 9; or
 - 5 (b) a nucleotide sequence substantially identical to SEQ ID NO:5, 7, or 9.
45. The isolated *SLC26A9* nucleic acid molecule of claim 42, further comprising a nucleic acid molecule selected from the group consisting of:
- 10 (a) an isolated nucleic acid molecule encoding a polypeptide of SEQ ID NO:6, 8, or 10;
 - (b) an isolated nucleic acid molecule of SEQ ID NO:5, 7, or 9;
 - (c) an isolated nucleic acid molecule which hybridizes to a nucleic acid sequence of SEQ ID NO:5, 7, or 9 under wash stringency conditions represented by a wash solution having less than
 - 15 about 200 mM salt concentration and a wash temperature of greater than about 45°C, and which encodes a *SLC26A9* polypeptide; and
 - (d) an isolated nucleic acid molecule differing by at least one functionally equivalent codon from the isolated nucleic acid molecule of one of (a), (b), and (c) above in nucleic acid
 - 20 sequence due to the degeneracy of the genetic code, and which encodes a *SLC26A9* polypeptide encoded by the isolated nucleic acid of one of (a), (b), and (c) above.
46. A method for detecting a *SLC26A9* nucleic acid molecule, the method comprising:
- 25 (a) procuring a biological sample having nucleic acid material;
 - (b) hybridizing the nucleic acid molecule of SEQ ID NO:5, 7, or 9 under stringent hybridization conditions to the biological sample of (a), thereby forming a duplex structure between the
 - 30 nucleic acid of SEQ ID NO:5, 7, or 9 and a nucleic acid within the biological sample; and
 - (c) detecting the duplex structure of (b), whereby a *SLC26A9*

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nucleic acid molecule is detected.

7. A method for producing an antibody that specifically recognizes a SLC26A9 polypeptide, the method comprising:
- 5 (a) recombinantly or synthetically producing a SLC26A9 polypeptide;
 - (b) formulating the polypeptide of (a) whereby it is an effective immunogen;
 - 10 (c) administering to an animal the formulation of (b) to generate an immune response in the animal comprising production of antibodies, wherein antibodies are present in the blood serum of the animal; and
 - (d) collecting the blood serum from the animal of (c) comprising antibodies that specifically recognize a SLC26A9 polypeptide.
48. The method of claim 47, wherein the SLC26A9 polypeptide
- 15 comprises:
- (a) a polypeptide encoded by a nucleic acid of SEQ ID NO:5, 7, or 9;
 - (b) a polypeptide encoded by a nucleic acid substantially identical to SEQ ID NO:5, 7, or 9;
 - 20 (c) a polypeptide comprising an amino acid sequence of SEQ ID NO:6, 8, or 10; or
 - (d) a polypeptide substantially identical to SEQ ID NO:6, 8, or 10.
49. The method of claim 47, wherein the SLC26A9 polypeptide is encoded by an isolated nucleic acid segment selected from the group
- 25 consisting of:
- (a) an isolated nucleic acid molecule encoding a polypeptide of SEQ ID NO:6, 8, or 10;
 - (b) an isolated nucleic acid molecule of SEQ ID NO:5, 7, or 9;
 - 30 (c) an isolated nucleic acid molecule which hybridizes to a nucleic acid sequence of SEQ ID NO:5, 7, or 9 under wash stringency conditions represented by a wash solution having less than about 200 mM salt concentration and a wash temperature of

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greater than about 45°C, and which encodes a functional SLC26A9 polypeptide; and

- 5 (d) an isolated nucleic acid molecule differing by at least one functionally equivalent codon from the isolated nucleic acid molecule of one of (a), (b), and (c) above in nucleic acid sequence due to the degeneracy of the genetic code, and which encodes a SLC26A9 polypeptide encoded by the isolated nucleic acid of one of (a), (b), and (c) above.

50. An antibody produced by the method of claim 47.

10 51. A method for detecting a level of a SLC26A9 polypeptide, the method comprising

- (a) obtaining a biological sample having peptidic material;
(b) detecting a SLC26A9 polypeptide in the biological sample of (a) by immunochemical reaction with the antibody of claim 50,
15 whereby an amount of SLC26A9 polypeptide in a sample is determined.

52. A method for identifying a modulator of a SLC26A9 polypeptide, the method comprising:

- (a) providing a recombinant expression system whereby a
20 SLC26A9 polypeptide is expressed in a host cell;
(b) providing a test substance to the system of (a);
(c) assaying a level or quality of SLC26A9 function in the presence of the test substance;
(d) comparing the level or quality of SLC26A9 function in the
25 presence of the test substance with a control level or quality of SLC26A9 function; and
(e) identifying a test substance as an anion transport modulator by determining a level or quality of SLC26A9 function in the presence of the test substance as significantly changed when
30 compared to a control level or quality of SLC26A9 function.

53. The method of claim 52, wherein the SLC26A9 polypeptide comprises:

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- (a) a polypeptide encoded by a nucleic acid of SEQ ID NO:5, 7, or 9;
- (b) a polypeptide encoded by a nucleic acid substantially identical to SEQ ID NO:5, 7, or 9;
- 5 (c) a polypeptide comprising an amino acid sequence of SEQ ID NO:6, 8, or 10; or
- (d) a polypeptide substantially identical to SEQ ID NO:6, 8, or 10.

54. The method of claim 52, wherein the SLC26A9 polypeptide is encoded by an isolated nucleic acid segment selected from the group consisting of:

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- (a) an isolated nucleic acid molecule encoding a polypeptide of SEQ ID NO:6, 8, or 10;
- (b) an isolated nucleic acid molecule of SEQ ID NO:5, 7, or 9;
- (c) an isolated nucleic acid molecule which hybridizes to a nucleic acid sequence of SEQ ID NO:5, 7, or 9 under wash stringency conditions represented by a wash solution having less than about 200 mM salt concentration and a wash temperature of greater than about 45°C, and which encodes a functional SLC26A9 polypeptide; and
- 15
- (d) an isolated nucleic acid molecule differing by at least one functionally equivalent codon from the isolated nucleic acid molecule of one of (a), (b), and (c) above in nucleic acid sequence due to the degeneracy of the genetic code, and which encodes a SLC26A9 polypeptide encoded by the isolated nucleic acid of one of (a), (b), and (c) above.
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55. The method of claim 52, wherein the host cell comprises a mammalian cell.

56. The method of claim 55, wherein the mammalian cell comprises a human cell.

30 57. An anion transporter modulator identified by the method of claim 52.

58. A method for modulating anion transport activity in a subject, the method comprising:

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- (a) preparing a composition comprising a modulator identified according to the method of claim 52, and a pharmaceutically acceptable carrier;
- (b) administering an effective dose of the composition to a subject, whereby anion transport activity is altered in the subject.

59. The method of claim 58, wherein the subject is a mammal.

60. The method of claim 59, wherein the subject is a human.

61. A method for identifying an anion exchanger modulator, the method comprising:

- (a) exposing a SLC26A9 polypeptide to one or more test substances;
- (b) assaying binding of a test substance to the isolated SLC26A9 polypeptide; and
- (c) selecting a candidate substance that demonstrates specific binding to the SLC26A9 polypeptide.

62. The method of claim 61, wherein the SLC26A9 polypeptide comprises:

- (a) a polypeptide encoded by a nucleic acid of SEQ ID NO:5, 7, or 9;
- (b) a polypeptide encoded by a nucleic acid substantially identical to SEQ ID NO:5, 7, or 9;
- (c) a polypeptide comprising an amino acid sequence of SEQ ID NO:6, 8, or 10; or
- (d) a polypeptide substantially identical to SEQ ID NO:6, 8, or 10.

63. The method of claim 61, wherein the SLC26A9 polypeptide is encoded by an isolated nucleic acid segment selected from the group consisting of:

- (a) an isolated nucleic acid molecule encoding a polypeptide of SEQ ID NO:6, 8, or 10;
- (b) an isolated nucleic acid molecule of SEQ ID NO:5, 7, or 9;
- (c) an isolated nucleic acid molecule which hybridizes to a nucleic acid sequence of SEQ ID NO:5, 7, or 9 under wash stringency

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conditions represented by a wash solution having less than about 200 mM salt concentration and a wash temperature of greater than about 45°C, and which encodes a functional SLC26A9 polypeptide; and

- 5 (d) an isolated nucleic acid molecule differing by at least one functionally equivalent codon from the isolated nucleic acid molecule of one of (a), (b), and (c) above in nucleic acid sequence due to the degeneracy of the genetic code, and which encodes a SLC26A9 polypeptide encoded by the
10 isolated nucleic acid of one of (a), (b), and (c) above.

64. The method of claim 61, wherein the host cell comprises a mammalian cell.

65. The method of claim 64, wherein the mammalian cell comprises a human cell.

15 66. An anion transporter modulator identified by the method of claim 61.

67. A method for modulating anion transport activity in a subject, the method comprising:

- 20 (a) preparing a composition comprising a modulator identified according to the method of claim 56, and a pharmaceutically acceptable carrier;
- (b) administering an effective dose of the composition to a subject, whereby anion transport activity is altered in the subject.

68. The method of claim 67, wherein the subject is a mammal.

69. The method of claim 68, wherein the subject is a human.

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